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INTEGRATING THE LONG TERM CAPITAL PLAN INTO CAPABILITY BASED PLANNING

BY

Jay Adamsson

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ABSTRACT

This report presents an analysis of the project information presented by the Long Term Capital Plan submissions that may assist in defining a reasonable set of Canadian Forces capabilities necessary to address Canadian security requirements. Although problems do exist with the data collected, a statistical analysis of operational tasks from the Joint Task List provides a number of groupings of related tasks. These groupings can be used as support for an eventual definition of Canadian Forces capabilities.

This report also gives the author's vision of a capability based planning process. In this process, risk is determined at a departmental level, then translated into a number of capability options. These capability options are addressed through projects. Combining the capability options with the project costs yields a blueprint to address the maintenance of overall CF capability for the lowest cost.

RÉSUMÉ

Ce rapport présente une analyse des renseignements sur le projet fournis dans le Plan d'immobilisations à long terme. Ces renseignements peuvent aider à définir un ensemble des capacités que les Forces canadiennes nécessitent pour répondre aux besoins du canada en matière de sécurité. Même si les données recueillies présentent des problèmes, une analyse statistique des tâches opérationnelles de la Liste de la force opérationnelle interarmées fournit un certain nombre d'articulations de tâches connexes. Ces articulations peuvent aider à définir éventuellement des capacités pour les Forces canadiennes.

Ce rapport indique également la manière dont l'auteur conçoit un processus de planification axé sur les capacités. Dans ce processus, le risque est déterminé à un niveau ministériel, avant d'être traduit en options de capacité. Ces dernières sont concrétisées au moyen de projets. La combinaison des options de capacité avec les coûts de projet produit un plan détaillé qui se préoccupe du maintien du potentiel global des FC au meilleur prix.

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GLOSSARY

CF	Canadian Forces
FIDO	Fundamental Investigation of Defence Options
JTL	Joint Task List
LTCP	Long Term Capital Plan
NATO	North Atlantic Treaty Organization
OOTW	Operations Other Than War
SCP	Strategic Capabilities Planning
SOCRAM	Scenario Operational Capability Risk Assessment Model

INTEGRATING THE LONG TERM CAPITAL PLAN INTO CAPABILITY BASED PLANNING

I – INTRODUCTION

1. The Long Term Capital Plan (LTCP) is a document produced yearly by the Department of National Defence to prioritize and justify the expenditure of capital funds. The Minister of National Defence accepts this document and passes it on to Treasury Board. This process is necessary to ensure the responsible use of public funds, but is especially important for the simple reason that the new equipment required by the Canadian Forces (CF) greatly exceeds the amount of cash available. The LTCP options consist of a number of distinct projects. The prioritized LTCP list of projects acts as the CF's priority list for the expenditure of capital funds.

2. Historically, there have been problems with the LTCP. In 1996, the minister accepted the LTCP and passed it on to Treasury Board. Since then, various ministers have not accepted the document. Furthermore, the LTCP has been criticized by the Auditor General and the Cabinet for failing to display a connection between the department's requests and goals.

3. From the inception of the LTCP through 1997, the list was generated using opinions and best judgements of departmental experts. Typically, accomplishing this involved sequestering the principal decision-makers in a room until they reached an agreement. This process provided the required list, but did not provide an accountable justification of the final product.

4. In 1998, an attempt to inject more rigour into the process resulted in ranking each project according to a variety of criteria. Each project was weighted under each criterion. Adding the weights gave each project a score. This resulted in a ranking of the projects. However, criticism for this effort came from two fronts. First, the weightings were quite subjective. Secondly, the criteria selected did not link the prioritized projects to the

department's goals in a comprehensible and transparent manner.

5. Finally, in 1999, a draft Strategic Capabilities Planning (SCP) document attempted to provide the link between military capabilities and the department's goals. Identifying projects in terms of military capabilities provided the elusive link to departmental goals. The process outlined in the SCP sets out a logical framework for developing a LTCP that addresses concerns about excessive subjectivity and provides a linkage between Defence Objectives and capital projects. The SCP does this by incorporating decision support models that use carefully selected criteria.

6. To make the best use of these new systems, there was a need for tools to assist in converting the SCP goals to a viable LTCP. The first, Fundamental Investigation of Defence Options (FIDO), applies the criterion to the projects, and produces an overall ranking from a number of individual rankers, as described in reference [1]. The second is the LTCP database. This database organizes the projects and keeps track of the connections between the projects and the stated departmental goals. Annex A contains an overview of the implementation of the database for the 1999 LTCP process.

7. To implement the SCP-LTCP system an explicit connection between projects and departmental goals is required. There are three components to this connection identified for each project. The departmental objectives (as described in reference [2]) influenced by the project are identified. The departmental scenarios (as described in reference [3]) for which the project is applicable are also identified. The final component identified is the military capabilities affected by the project. These capabilities are described in terms of the Joint Task List (JTL).

8. This report describes briefly the Joint Task List currently being developed for Canadian use. It then presents an analysis of project linkages to the JTL as outlined in project submissions for the 1999 LTCP process. The analysis looks for groups of tasks that seem to occur together more often than would be expected by random chance. This evidence for task groupings can then be considered in the construction of the Canadian JTL. It then goes on to discuss a vision of a future capability planning process and the data structures required for its support.

II - JOINT TASK LIST

9. The Joint Task List (JTL) is a comprehensive, hierarchical list of tasks that could be performed by a joint force. A copy of the JTL used for this database is in Annex B. The version of the JTL used has three components - strategic, operational, and tactical. Each component is itself a three-level hierarchy, starting from the most general description of tasks to the more specific.

10. The first effort at creating a Canadian JTL was made by the Joint staff. The list they developed was considered, but was found to be incomplete. The current process began by obtaining copies of the JTL developed by the United States (from Dynamic Research Corporation), by the United Kingdom (from the Permanent Joint Headquarters), and by NATO (from SACLANT). The United States first developed the JTL, then the United Kingdom and NATO produced their own lists using the US version as a template. After considering all three JTL, the UK version was considered the most applicable to Canadian operations. There are two main reasons for choosing the UK version over the US version. The first and principal reason for this decision is the incorporation of non-fighting tasks into the JTL. This provides a broader definition of security. Secondly is the commonality of doctrine, particularly in the area of civil-military relations.

11. The US JTL consists of three main components. Apart from the task list itself, the US version also includes a list of conditions, enabling a consistent description of operations and scenarios, and a list of measures, permitting a consistent and understandable record of performance. A new Canadian JTL was created by merging these US conditions and measures with the UK tasks. The Canadian JTL is thus a hybrid of the UK and US JTL.

12. Development of the Canadian JTL is continuing. The 1999 LTCP process, as laid out in this report, used the UK JTL version 3.8. In the meantime, the UK JTL version 4.0 has been released, and is being used as the basis for the Canadian JTL. Although some portions of version 3.8 have been changed in version 4.0, most of the tasks can be directly mapped from the old version to the new version.

III - LTCP AND JTL RELATIONSHIPS

BACKGROUND

13. The LTCP component of the 1999 SCP initiative was based on submitted projects, an example of which is given in Annex C. Each project team was requested to identify the JTL tasks that are impacted by their project. This took the form of a simple list of tasks. An analysis of these contributions was expected to provide some evidence for the organization of tasks into complimentary groups.

PROJECT SUBMISSIONS

14. The concentration on operational tasks is the first and most obvious aspect of the JTL entries provided for the projects. Almost all the projects provided a JTL list for operational tasks, but very few provided strategic and tactical lists. Twenty-one of the projects did not provide any information. Of the remaining 80 projects, all provided operational task entries, only one project provided any tactical entries, and nine projects provided strategic entries.

15. The JTL connections identified with each project also have no associated prioritization. This means that the project sheets identified all the impacted areas, not only the areas of major impact. Moreover, cases were observed in which a project designed to address a deficiency in a specific capability area lists many other areas, none of which are necessarily areas of deficiency. Because of this, any analysis of capability deficiencies based upon the current project sheets tends to overstate the problem areas.

16. The accuracy of information is another area of concern with the project sheets. The project teams provided the information without independent verification. As such, the information provided may be vulnerable to questionning.

17. In terms of sheer number, projects identifying Operational Task 3 (Conduct Operations, denoted OP 3) outweighed any other first level task. Table I shows the breakdown by first level task.

TABLE I

NUMBER OF PROJECTS BY FIRST LEVEL OP TASK

Task	Number of Projects
OP 1 - Op Mobility	32
OP 2 - Information and Intelligence	29
OP 3 - Conduct Operations	69
OP 4 - Sustain the Force	32
OP 5 - Command and Control	28
OP 6 - Force Protection	46

18. Table II looks at OP 3, broken down to the second level tasks. Five of the subtasks are affected by over half of the projects in this category. Of particular interest is the number of projects listed for non-warfighting tasks. The tasks OP 3.7, OP 3.8, and OP 3.9 relate to operations other than war (OOTW) from peacetime security through peace enforcement. The number of projects related to OOTW demonstrates the growing influence of these non-traditional areas of operation.

TABLE II

NUMBER OF PROJECTS BY SECOND LEVEL OP 3 TASKS

Task	Number of Projects
OP 3.1 - Conduct Joint Force Targeting	12
OP 3.2 - Attack Targets	32
OP 3.3 - Conduct Manoeuvre Operations	52
OP 3.4 - Control Significant Area	42
OP 3.5 - Employ C2W	17
OP 3.6 - Provide Defence vs Air, Missile, and Torps	12
OP 3.7 - Peacetime Security	45
OP 3.8 - Conduct Peacekeeping Operations	50
OP 3.9 - Conduct Peace Enforcement Operations	49

19. Table III lists nineteen of the projects under OP 3 (Conduct Operations). Although open to interpretation, a quick scan of these projects suggests that OP 3 is not the principal area of concern for many of these projects. For instance, the first project on the list, Air Force Command and Control Information System, in all probability lies principally in OP 5 (Command and Control), with only a secondary influence on OP 3. This highlights a problem with the current manner of data collection, and a limitation on the utility of the collected data set.

TABLE III

SOME PROJECTS LINKED TO OP 3

AFCCIS (Air Force Command and Control Information System)
ALSC (Afloat Logistics and Sealift Capability)
Armour Combat Vehicle (ACV)
Army GPS Equipment Replacement (AGER)
Aurora Incremental Modernization
CF-18 Incremental Modernization
Counter-Bombardment Target Acquisition (CBTA)
Improved Carl Gustaf (ICG)
Intelligence Surveillance Target Acquisition and Command and Control (ISTAR C2)
Land Mine Clearance System (LMCS)
LAV Ambulances
M113 Life Extension (LE)
Maritime Helicopter Replacement
Medium Logistics Vehicle Wheeled (MLVW)
New Tactical Transport
Unit Surveillance, Target Acquisition and Night Observation (Unit STANO)
Unmanned Aerial Surveillance Target Acquisition System (UASTAS)
Weapon Effects Simulation (WES)
Wheeled Light Armoured Vehicle Life Extension (WLAV LE)

LEVEL 1 TASK COMMONALITIES

20. Notwithstanding the limitations of the data, connections can be demonstrated between the different tasks. Table IV shows the commonality between level 1 tasks. The chart gives the number of projects that contain both tasks. The last row of the chart gives the total number of projects containing the indicated task. For example, the chart shows that 40%, or 32 of the eighty projects identified OP 1 (Op Mobility), while 36.3%, or 29 identified OP 2 (Information and Intelligence). Thirteen of the projects identified both OP 1 and OP 2.

TABLE IV

OBSERVED COMMONALITIES BETWEEN LEVEL 1 TASKS

	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6
OP 1	0	13	32	18	12	21
OP 2	13	0	27	12	16	17
OP 3	32	27	0	30	24	42
OP 4	18	12	30	0	17	20
OP 5	12	16	24	17	0	16
OP 6	21	17	42	20	16	0
Total	32 (40%)	29 (36.3%)	69 (86.3%)	32 (40.0%)	28 (35.0%)	46 (57.5%)

21. The expected number of projects containing both tasks can be calculated by multiplying together the percentage of projects identifying each task, then applying the factor to the eighty projects. For instance, 40% of projects identified Task 1, and 36.3% of all projects identified Task 2. Random selection of projects would yield an expected value of 14.5% (40% times 36.3%) of all projects having both tasks. Starting with eighty projects, this translates into an 11.6 expected commonality. The expected commonality for all level 1 operational tasks is shown in Table V.

TABLE V

EXPECTED COMMONALITYBETWEEN LEVEL 1 TASKS

	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6
OP 1	0	11.6	27.6	12.8	11.2	18.4
OP 2	11.6	0	25.1	11.6	10.2	16.7
OP 3	27.6	25.1	0	27.6	24.2	39.7
OP 4	12.8	11.6	27.6	0	11.2	18.4
OP 5	11.2	10.2	24.2	11.2	0	16.1
OP 6	18.4	16.7	39.7	18.4	16.1	0

22. Using these values, the probability that the commonality demonstrated is larger than that expected by pure random chance can be calculated with the binomial formula:

$$p = \sum_{i=k}^{n} \frac{n!}{i!(n-i)!} q^i (1-q)^{n-i}$$

where n is the number of observations (80 in this case), q is the product of the percentage of time each of the two tasks appeared multiplied together, and k is the observed number of common entries.

23. Table VI gives the probability that the observed degree of commonality is accounted for by random chance. In this table, the lower the probability, the greater the commonality. Any value of 5% or less is considered to demonstrate an unusually high degree of correspondence. Only two pairs of tasks exhibit this behaviour. OP 2 (Information and Intelligence) and OP 5 (Command and Control) exhibit a high degree of commonality, as do OP 4 (Sustain the Force) and OP 5 (Command and Control). Tasks OP 1 (Conduct Joint Force Targeting) and OP 4 (Sustain the Force) have a value of 8%, very close to the 5% cutoff.

TABLE VI

PROBABILITY OF RANDOMNESS BETWEEN LEVEL 1 TASKS

	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6
OP 1	0	37.6%	18.0%	8.0%	44.6%	28.3%
OP 2	37.6%	0	36.0%	50.0%	4.3%	51.1%
OP 3	18.0%	36.0%	0	32.5%	55.8%	34.4%
OP 4	8.0%	50.0%	32.5%	0	5.0%	37.7%
OP 5	44.6%	4.3%	55.8%	5.0%	0	55.6%
OP 6	28.3%	51.1%	34.4%	37.7%	55.6%	0

LEVEL 2 TASK COMMONALITIES

24. Applying the same technique to level 2 tasks is a bit more complex simply because there are 31 operational tasks at this level. The randomness probabilities are calculated in the same manner, but an additional cluster analysis technique is required to make any sense of the results. Using the matrix of probability of randomness, a cluster analysis identifies the

groups of tasks most closely related. Figure 1 shows the cluster tree resulting from a cluster analysis of level 2 tasks as produced by Systat Statistical Software.

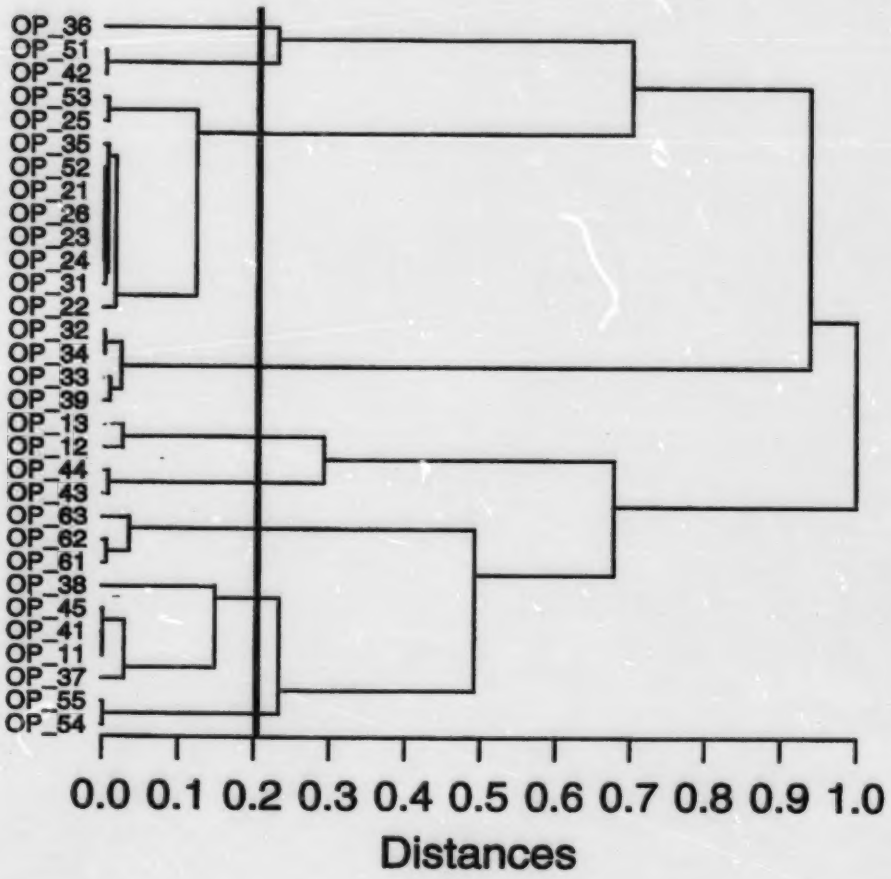

Figure 1: Cluster Tree of Level 2 Tasks

25. The clusters of tasks can be described from this chart by drawing a vertical line on the graph, and reading off the resultant groupings. For example, drawing a line at a distance of 0.2 is portrayed in Figure 1. This results in nine clusters, as shown in Table VII.

TABLE VII

LEVEL 2 CLUSTERS AT DISTANCE 0.2

Size of Cluster	Cluster Members
1	3.6 - Provide Defence against Air, Missile and Torpedoes
2	5.1 - Acquire & Communicate Info & Maintain Status 4.2 - Manage Equipment Support in Theatre
10	5.3 - Command Subordinate Forces 2.5 - Disseminate & Integrate Intelligence 3.5 - Employ C2W 5.2 - Prepare Plans & Orders 2.1 - Plan & Direct Intelligence Authorities 2.6 - Evaluate Intelligence Activities 2.3 - Process & Exploit Information 2.4 - Prepare Intelligence Products 3.1 - Conduct Joint Force Training 2.2 - Collect Information
4	3.2 - Attack Targets 3.4 - Control Significant Area 3.3 - Conduct Manoeuvre Operations 3.9 - Conduct Peace Enforcement Operations
2	1.3 - Provide Operational Counter Mobility 1.2 - Provide Mobility
2	4.4 - Rehabilitate Forces 4.3 - Coordinate Effective Manning of Joint Forces
3	6.3 - Provide NBC Protection 6.2 - Provide Force Security 6.1 - Provide Protection
5	3.8 - Conduct Peacekeeping Operations 4.5 - Develop Forward Bases 4.1 - Manage Logistics Support in Theatre 1.1 - Conduct Movement 3.7 - Peacetime Security
2	5.5 - Provide Civil Affairs & Integrate Multinational, OGDs 5.4 - Organize Joint Force Headquarters

26. Considering each group individually, there is a commonality between the tasks. One interesting observation is the placement of Task 3.9 (Conduct Peace Enforcement Operations). This has been grouped with combat-oriented tasks, and not with peacekeeping operations, even though the placement of peace enforcement in the UK JTL itself suggests a closer relationship to peacekeeping than combat.

27. The results shown above should be considered in the current work to Canadianize the JTL. A close correlation between the two studies would provide independent evidence for the task groupings.

IV - OPTIONS ANALYSIS IN CAPABILITY PLANNING

COST VS. RISK

28. The process proposed in the following section is the view of the author as to the proper vision to strive for in the implementation of a capability based planning process. It incorporates quantifiable measures where appropriate, and allows for the inclusion of qualitative measures where required. The process shows how various capability areas can be aggregated into a higher entity. This results in a method that quantifies the impact of trading off capability areas against each other, thereby providing a better basis for difficult decisions. First, the proposed vision is sketched out, then an example is shown to illustrate the technique.

29. Capability based planning is not an easy process to carry out effectively. Planning can no longer be conducted by counting the number of missiles in the arsenal of your enemies, then ensuring you have more. Planning now requires a clearly stated and defined set of capabilities required to achieve national defence objectives, and a set of measures to gauge the effectiveness of each. This is not an easy goal to reach, but progress has already begun with the introduction of the JTL and a realization that capability based planning must be pursued. This proposal does not show how to develop these definitions and measures, but shows how to make the best use of them.

30. In a resource-constrained environment, planning must provide guidance in trading off one resource area over another. In an ideal world, risks would be minimal, and there would be sufficient resources to provide all the capability requirements to minimize risk. However, in the real world, resources are limited, resulting in the introduction of risk. The

object is therefore to minimize risk and cost simultaneously.

31. A capability planning process should produce two items. First, it should produce a relationship between operational risk and cost, as shown in Figure 2. The determination of operational risk depends on a process incorporating departmental scenarios and levels of capability. This allows goals to be set dependent upon available resource constraints. Secondly, a planning process should produce a blueprint for progress to reach a desired goal. This would be a long-term plan to reach any desired risk level.

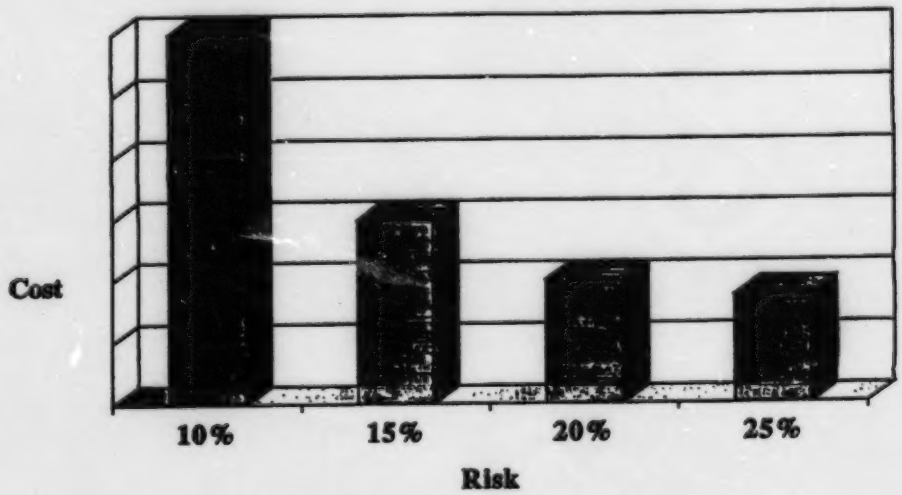

Figure 2: Cost vs. Risk Graph

32. Producing the cost figure for a specified risk level requires a comprehensive capability planning process, as shown in Figure 3. There are three distinct levels to this process. The top level is an overall risk determination. This is the level of risk for which cost is to be determined.

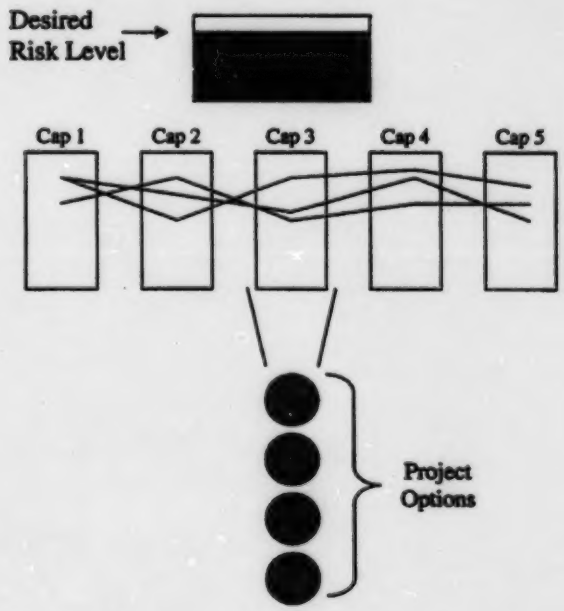

Figure 3: Capability Management Structure

33. Once a risk level is set, a conversion into capability areas is required. This is implemented through a risk assessment model. This provides a list of options for capability levels. There are many ways to achieve a given overall risk, involving tradeoffs of one capability against another. Each line running across Figure 3 represents one combination of individual capability levels required to achieve the overall risk level.

34. Finally, after the determination of the capability level options, projects can be considered. Effective management of capability levels in this sense requires a different set of data than the current LTCP. Instead of a project simply providing a proposal for the purchase of a specified amount of equipment, a project will have to specify a range of options. These options will have to consider different levels of capability and financial requirements for each. This variability then provides capability managers with options to select the lowest cost for a specified level of risk. As has already been noted, deriving definitions of levels of capability is not an easy process, but is essential to any capability based planning, whether based on this scheme or not.

35. As shown in Figure 4, the different project options provide different levels of capability, each of which are likely to have different costs. This process must be repeated for each capability, giving a list of options, costs, and capability levels.

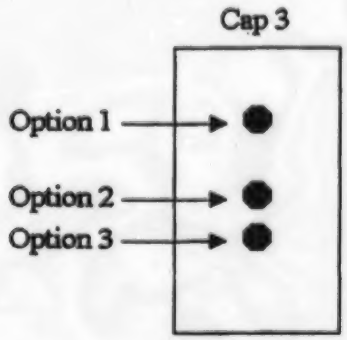

Figure 4: Project Options to Capabilities

36. Figure 5 shows the results of superimposing project options on the acceptable risk limits. The cost of an option (as given by a line through the capability boxes) is calculated by adding, for each capability, the cost of the cheapest option above the risk line. This associates a cost value with each set of capability options from which the cheapest alternative can be chosen. This gives the optimum cost for achieving a level of risk. The process can then be repeated for each risk level to complete the chart in Figure 2.

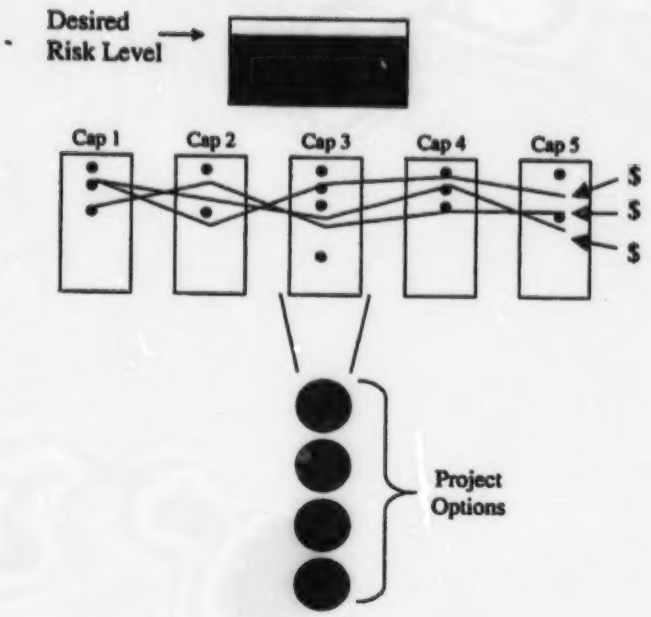

Figure 5: Optimizing Capability Options

DATA REQUIREMENTS

37. The link between system risk and capability levels is heavily dependent upon the expected role of the Canadian Forces. Assuming the risk assessment is based upon the departmental scenarios, there is a large amount of flexibility in Canadian commitments to scenarios. This system works for a defined role for the Canadian Forces. However, even if that role is not accurately established, it is possible to create a risk vs. cost graph for three different roles. An activist, pacifist, and moderate Canadian policy can be modeled, presenting three different risk vs. cost graphs. This assesses the impact of the Canadian role upon the requirements of the Canadian Forces.

38. The implication of this system is a change in project requirements. Under the current system, projects are forwarded as a single option. There is no freedom to adjust the quantity of items purchased under the project without making significant changes to the project itself. This alternative would require the project to provide options, complete with costs. Only in this manner is there sufficient flexibility for capability managers to manage departmental risks.

39. Determining operational risk would be a two step process. The first step is to assess the capability level provided by the various options. Secondly, the impact on the overall operational risk is determined from the full set of capabilities. This avoids trying to assess departmental risk without having a full picture of levels of all capabilities. Project teams may still conduct the first assessment. However, the second step would probably occur at a level outside the purview of the project teams.

40. This link from project options to capability levels is currently conducted in an ad-hoc fashion, if conducted at all. This requires first the establishment of generally agreed capability areas. This is currently being pursued through the Canadianization of the JTL. Secondly, this requires the development of definitions of capability levels for each capability area. The existing conditions and levels within the JTL provide a basis for development of these measures. The scenarios also provide a guiding hand in developing measures. This is not an easy step. However, it is essential to capability based planning. It is impossible to conduct effective capability based planning unless there is a clear set of capabilities and definitions.

41. Also needed is a means of translating project options into capability levels. This involves modeling and Operational Research for quantitative areas, and consensus and group decision techniques for qualitative areas.

SAMPLE ANALYSIS

42. The goal is to produce a cost vs. risk graph. For this sample, four capability areas will be considered, named Cap 1 through Cap 4. Through a tool such as the Scenario Operational Capability Risk Assessment Model (SOCRAM) described in reference [4], the capability options for each system risk level have been determined, as shown in Table VIII.

TABLE VIII

CAPABILITY OPTIONS FOR GIVEN RISK LEVELS

Risk Level	Capability Options			
	Cap 1	Cap 2	Cap 3	Cap 4
5 %	8	8	9	9
	8	9	9	8
	9	8	9	8
	9	8	8	9
10 %	8	8	8	8
	6	8	9	9
	9	9	8	9
	9	7	9	9
15 %	6	6	8	9
	6	7	9	8
	6	9	9	6
	8	6	9	8
	8	8	8	8
	9	8	7	8
20 %	5	9	9	9
	9	8	7	7
	6	9	6	7
	8	8	4	9

43. The second piece needed to complete the analysis is the list of project options and associated costs. Table IX gives the list of options and costs.

TABLE IX

CAPABILITY OPTIONS AND COSTS

Cap 1	**Project**	1A	1B	1C	[redacted]
	Level	6	8	9	
	Cost	$30M	$40M	$70M	
Cap 2	**Project**	2A	2B	[redacted]	
	Level	7	9		
	Cost	$100M	$120M		
Cap 3	**Project**	3A	3B	3C	3D
	Level	5	7	8	9
	Cost	$20M	$35M	$40M	$45M
Cap 4	**Project**	4A	4B	4C	[redacted]
	Level	7	8	9	
	Cost	$50M	$70M	$100M	

44. First, consider a 5% risk level. There are four capability options that give this risk level. For each option, the table shows the first project option that meets or exceeds that requirement, and the associated cost. Adding the costs across the table gives a total cost for the option. As shown in the table, the lowest cost option reaching a 5% risk level is at $275M. This gives a data point in the risk vs. cost graph. Tables XI through XIII give the options analysis for 10%, 15%, and 20% risk levels respectively.

TABLE X

OPTION ANALYSIS FOR 5% RISK LEVEL

Risk Level	**Capability - Option - Cost**				
	Cap 1	**Cap 2**	**Cap 3**	**Cap 4**	**Total**
5 %	8 - 1B - $40M	8 - 2B - $120M	9 - 3D - $45M	9 - 4C - $100M	$305M
	8 - 1B - $40M	9 - 2B - $120M	9 - 3D - $45M	8 - 4B - $70M	$275M
	9 - 1C - $70M	8 - 2B - $120M	9 - 3D - $45M	8 - 4B - $70M	$305M
	9 - 1C - $70M	8 - 2B - $120M	8 - 3C - $40M	9 - 4C - $100M	$330M

TABLE XI

OPTION ANALYSIS FOR 10% RISK LEVEL

Risk Level	Capability - Option - Cost				
	Cap 1	Cap 2	Cap 3	Cap 4	Total
10 %	8 - 1B - $40M	8 - 2B - $120M	8 - 3C - $40M	8 - 4B - $70M	$270M
	6 - 1A - $30M	8 - 2B - $120M	9 - 3D - $45M	9 - 4C - $100M	$295M
	7 - 1B - $40M	9 - 2B - $120M	8 - 3C - $40M	9 - 4C - $100M	$300M
	7 - 1B - $40M	7 - 2A - $100M	9 - 3D - $45M	9 - 4C - $100M	$295M

TABLE XII

OPTION ANALYSIS FOR 15% RISK LEVEL

Risk Level	Capability - Option - Cost				
	Cap 1	Cap 2	Cap 3	Cap 4	Total
15 %	6 - 1A - $30M	6 - 2A - $100M	8 - 3C - $40M	9 - 4C - $100M	$270M
	6 - 1A - $30M	7 - 2A - $100M	9 - 3D - $45M	8 - 4B - $70M	$245M
	6 - 1A - $30M	9 - 2B - $120M	9 - 3D - $45M	6 - 4A - $50M	$245M
	8 - 1B - $40M	6 - 2A - $100M	9 - 3D - $45M	8 - 4B - $70M	$255M
	8 - 1B - $40M	8 - 2B - $120M	8 - 3C - $40M	8 - 4B - $70M	$270M
	9 - 1C - $70M	8 - 2B - $120M	7 - 3B - $35M	8 - 4B - $70M	$295M

TABLE XIII

OPTION ANALYSIS FOR 20% RISK LEVEL

Risk Level	Capability - Option - Cost				
	Cap 1	Cap 2	Cap 3	Cap 4	Total
20 %	5 - 1A - $30M	9 - 2B $120M	9 - 3D - $45M	9 - 4C - $100M	$295M
	9 - 1C - $70M	8 - 2B $120M	7 - 3B - $35M	7 - 4A - $50M	$275M
	6 - 1B - $30M	9 - 2B $120M	6 - 3B - $35M	7 - 4A - $50M	$235M
	8 - 1B - $40M	8 - 2B $120M	5 - 3A - $20M	9 - 4C - $100M	$280M

45. By reading out the minimum cost option for each risk level, a risk vs. cost chart is derived. This chart is shown in Figure 6.

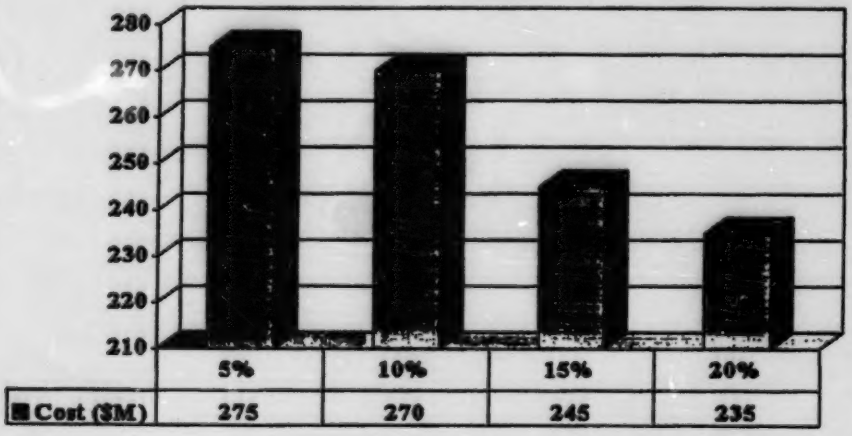

Figure 6 - Sample Risk vs. Cost

46. This sample problem, though simple in nature, demonstrates the method of determining the risk vs. cost graph. It also shows how options in capability mixtures lead to the choices of different options, resulting in different costs.

V - CONCLUSIONS

47. This report has looked at the information presented by LTCP project submissions that can be used towards defining a set of Canadian capabilities. Although problems do exist with the data collected, a statistical analysis of level 2 operational tasks provides a number of groupings of related tasks. This list is reproduced below in Table XIV. As the Canadian JTL is developed, these groupings should be considered and examined. The groupings provide evidence for commonality within the JTL. This is a logical manner of grouping tasks that may provide benefits to capability analysis and planning.

TABLE XIV

GROUPS OF COMMON TASKS

Size of Cluster	Cluster Members
1	3.6 - Provide Defence against Air, Missile and Torpedoes
2	5.1 - Acquire & Communicate Info & Maintain Status 4.2 - Manage Equipment Support in Theatre
10	5.3 - Command Subordinate Forces 2.5 - Disseminate & Integrate Intelligence 3.5 - Employ C2W 5.2 - Prepare Plans & Orders 2.1 - Plan & Direct Intelligence Authorities 2.6 - Evaluate Intelligence Activities 2.3 - Process & Exploit Information 2.4 - Prepare Intelligence Products 3.1 - Conduct Joint Force Training 2.2 - Collect Information
4	3.2 - Attack Targets 3.4 - Control Significant Area 3.3 - Conduct Manoeuvre Operations 3.9 - Conduct Peace Enforcement Operations
2	1.3 - Provide Operational Counter Mobility 1.2 - Provide Mobility
2	4.4 - Rehabilitate Forces 4.3 - Coordinate Effective Manning of Joint Forces
3	6.3 - Provide NBC Protection 6.2 - Provide Force Security 6.1 - Provide Protection
5	3.8 - Conduct Peacekeeping Operations 4.5 - Develop Forward Bases 4.1 - Manage Logistics Support in Theatre 1.2 - Conduct Movement 3.7 - Peacetime Security
2	5.5 - Provide Civil Affairs & Integrate Multinational, OGDs 5.4 - Organize Joint Force Headquarters

48. This report also gives the author's vision of a capability based planning process. In this process, risk is determined at a departmental level, then translated into a number of capability options. These capability options are addressed through projects. Combining the capability options with the project costs yields a blueprint to address the maintenance of overall CF capability for the lowest cost.

REFERENCES

1. J. Offiong, *The Fundamental Investigation of Defence Objectives (FIDO) - A Multi-Criteria Decision Model*, DOR (J&L) Research Note, Draft.

2. Department of National Defence, *Defence Planning Guidance 2000*.

3. A. Bradfield, G. Christopher, LCol D. McLean, *The Development of a Scenario Set for Departmental Force Planning*, DOR (J&L) Research Note 9822, November 1998.

4. R. Funk, *Scenario Operational Capability Risk Assessment Model (SOCRAM) – Presentation To The Canadian Operational Research Society (CORS) Conference '99 At Windsor Ontario, 8 June 1999*, DOR (J&L) Research Note 9914, October 1999

ANNEX A - LTCP DATABASE

1. The construction of the tables in the LTCP database used the project template as a guide. An information and analysis shell followed construction of the tables. Figure A-1 shows the startup screen of the database.

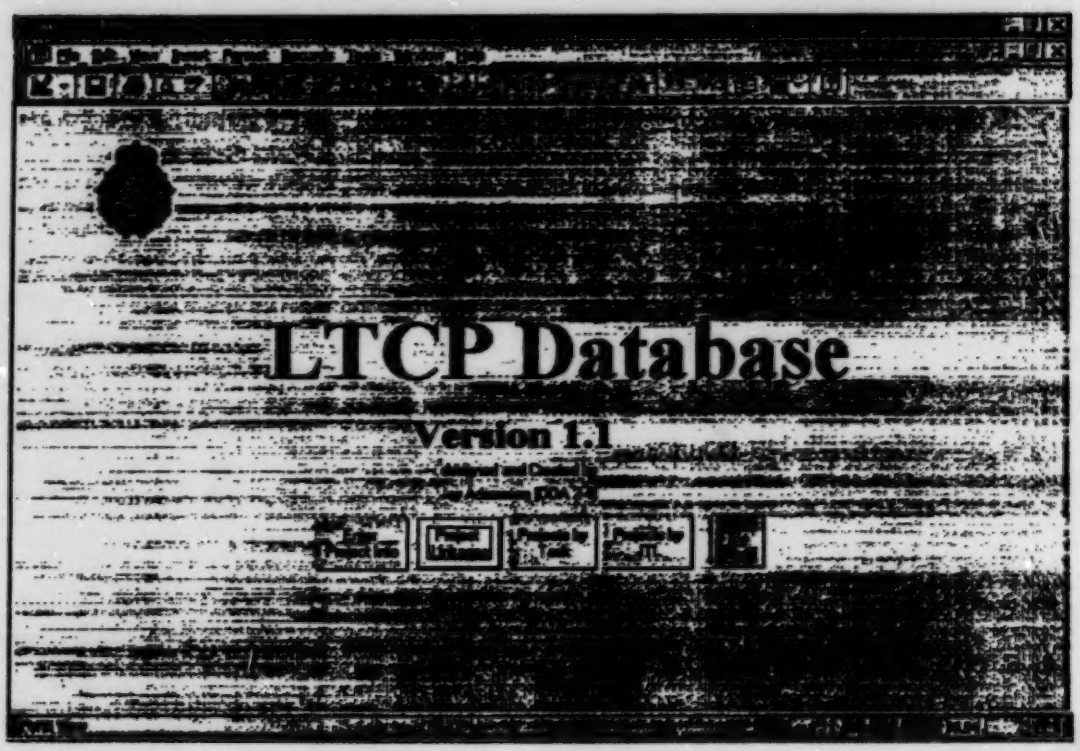

Figure A-1: LTCP Database Main Screen

ENTER PROJECT INFO

2. This section of the application permits the modification and addition of project information to the database. It is also the primary means of searching the database. Figure A-2 shows this screen. There are three tabs on the screen. The first, Project Details, is an overall description of the project and the deficiency it addresses. The second tab, Project

Milestones and Cashline, shows the identified timeline for the project and the cash requirement on a year-by-year basis. The third tab, Project Assessment Factors, is a description of the project in terms of a number of factors crucial to the prioritization of the project. These factors include the tasks in the JTL affected by this project.

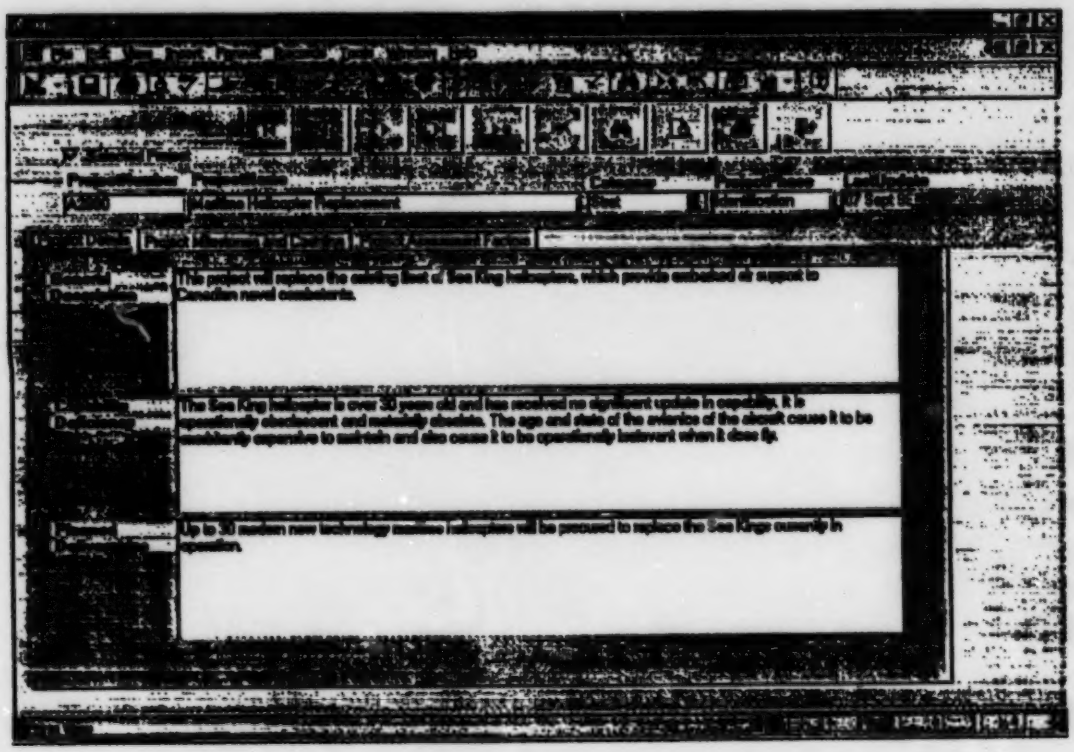

Figure A-2: Project Entry Screen

3. The navigation buttons across the top of the screen, from left to right, are: go to the first project, go to the previous project, go to the next project, go to the last project, add a new project, delete a project, find a project, preview a print-out of the current project, print out the current project, and exit the screen.

4. The check box at the top of the screen shows the selected status of the project. The rest of the database tool shows only the selected projects, although all projects are visible through this screen. Clicking in this check box changes the selected status of the project.

PROJECT LINKAGES

5. As explained earlier, part of the project requirements included relating each project to the JTL. This information provides a link to required capabilities as expressed by the JTL, as well as allowing for a comparison of similar projects. The screen shown in Figure A-3 displays the links between projects.

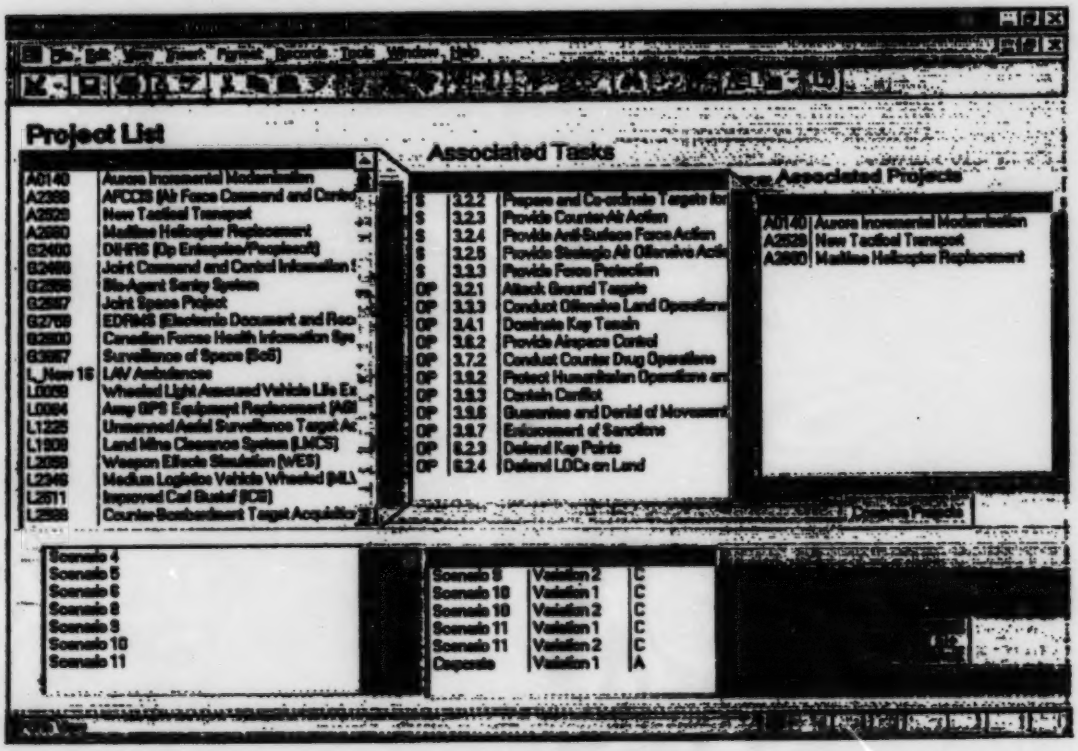

Figure A-3 : Project Linkages

6. The project template asked for the list of departmental scenarios impacted by this project. The box below the project list shows this information for the highlighted project. In addition, the creation of the 1999 SCP provided an assessment of the requirement for each task under each scenario and variation. The list under the tasks provides this information for the highlighted task. There are three possible entries for each task/variation combination. An entry of "A" designates an essential capability. An entry of "C" designates a required coalition capability, leaving the extent of Canadian involvement under question. An entry of "X" designated a capability that is not required.

7. Double clicking on a project in the project list gives the project info screen for that project. In addition, double clicking on a task gives a description of that task.

8. Highlighting a project in the Project List and a project in the Associated Projects List, and clicking on the Compare Projects button can compare two related projects. The screen shown in Figure A-4 gives a list of tasks, and indicates which tasks are associated with each project. The list can show the full JTL, only the tasks for which at least one project is associated, or only the tasks that both projects have in common.

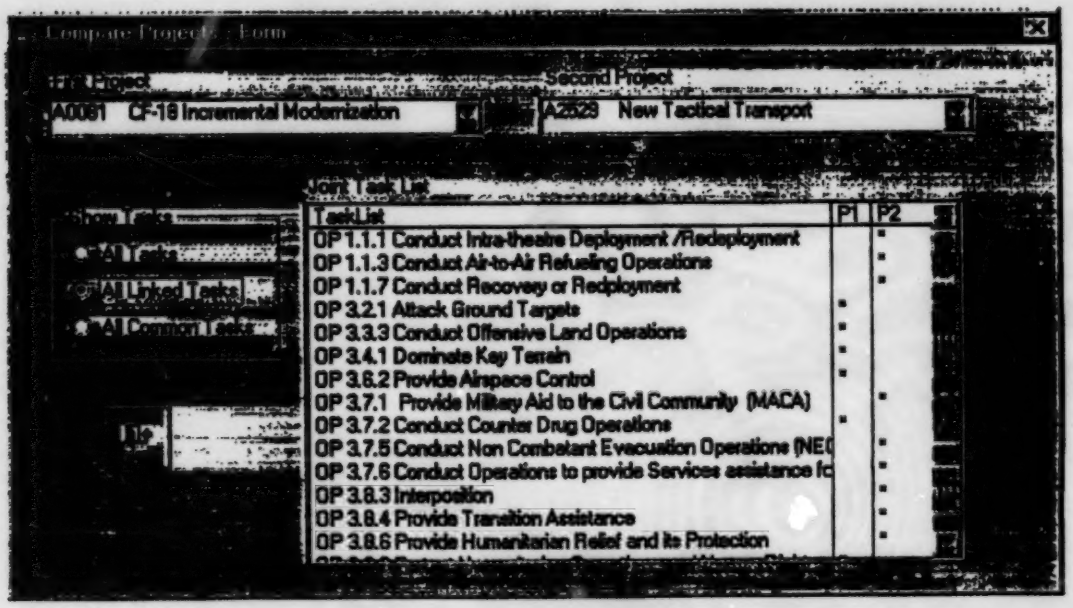
Second Project
A0061 CF-18 Incremental Modernization
A2528 New Tactical Transport
Joint Task List
Task List
P1
P2
OP 1.1.1 Conduct Intra-theatre Deployment /Redeployment
OP 1.1.3 Conduct Air-to-Air Refueling Operations
OP 1.1.7 Conduct Recovery or Redployment
OP 3.2.1 Attack Ground Targets
OP 3.3.3 Conduct Offensive Land Operations
OP 3.4.1 Dominate Key Terrain
OP 3.6.2 Provide Airspace Control
OP 3.7.1 Provide Military Aid to the Civil Community (MACA)
OP 3.7.2 Conduct Counter Drug Operations
OP 3.7.5 Conduct Non Combatant Evacuation Operations (NE
OP 3.7.6 Conduct Operations to provide Services assistance fo
OP 3.8.3 Interposition
OP 3.8.4 Provide Transition Assistance
OP 3.8.6 Provide Humanitarian Relief and its Protection

Figure A-4: Compare Projects

PROJECTS BY TASK

9. When considering a capability in the JTL, the list of associated projects can be seen as in Figure A-5. By choosing up to four tasks from the lists at the top of the screen, the associated projects can be seen. The list can show all projects, be limited to those projects that are associated with at least one of the tasks, or show only those projects that are associated with all the chosen tasks.

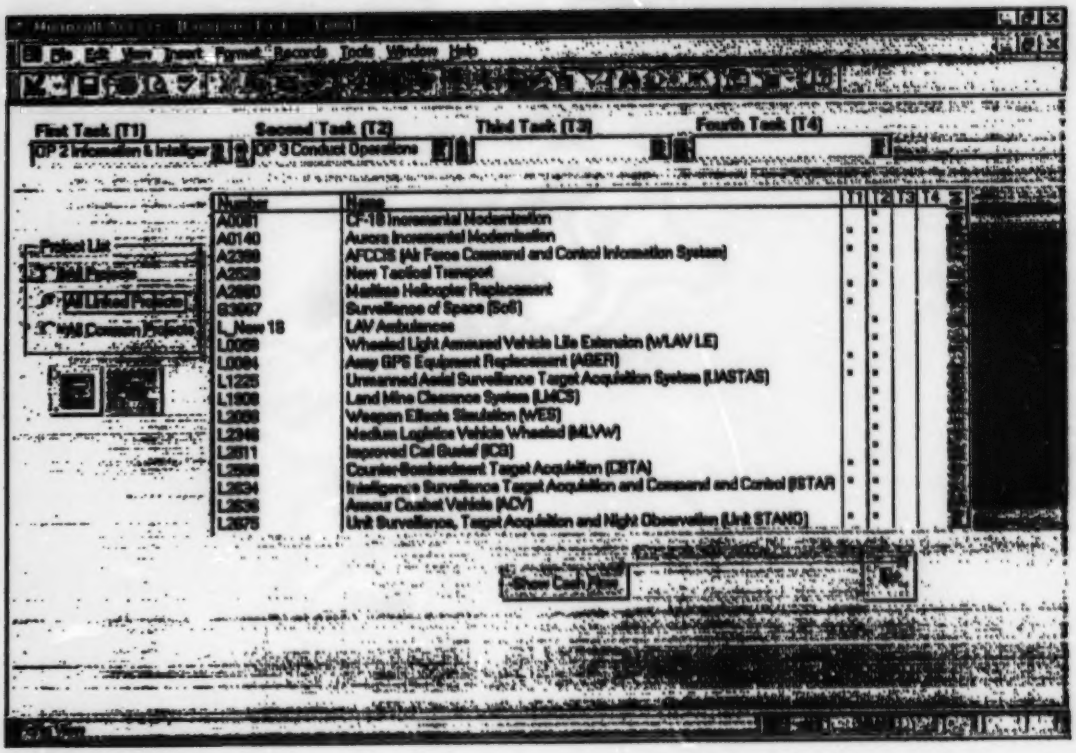

Figure A-5: Compare Tasks

10. Clicking on the Show Cash Flow button shows the total cash for the listed projects. The screen in Figure A-6 displays graphically the total cost of the projects listed.

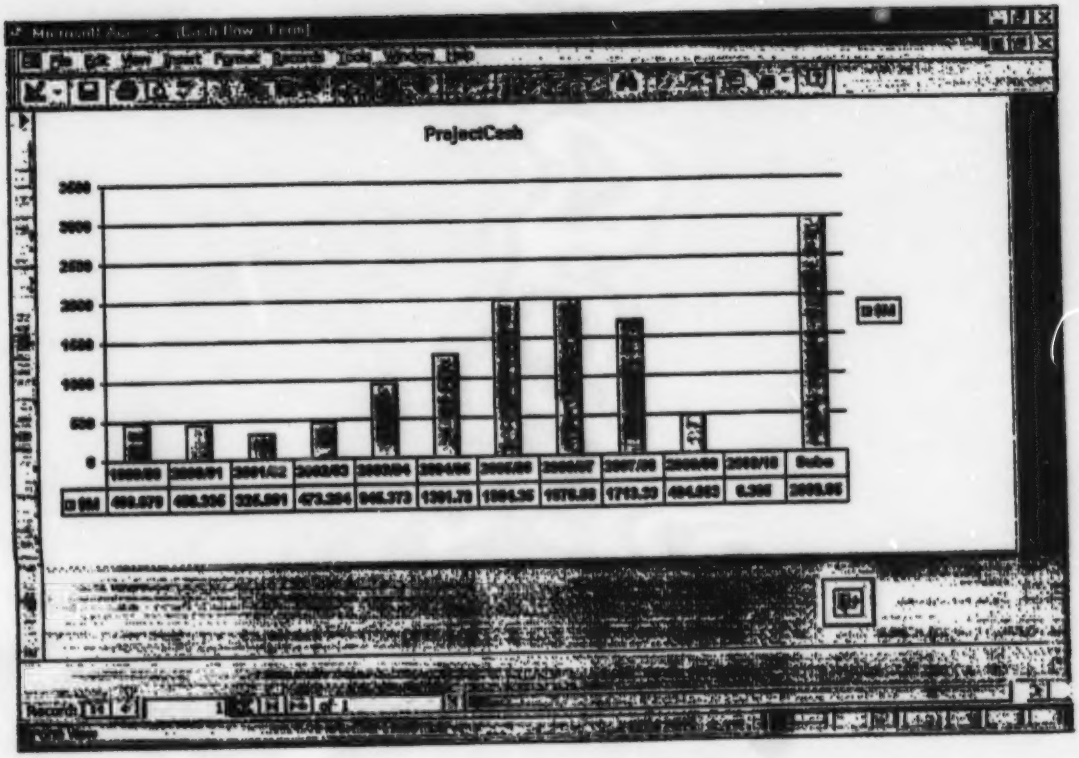

Figure A-6: Cash Flow

PROJECTS BY JTL

11. Figure A-7 shows the screen that gives the number of projects associated with each entry in the JTL. This screen graphs the number of projects that have identified a contribution to each task at level one and level two of the JTL. Since a project typically contributes to a number of varied tasks in the JTL, the sum of the entries on this screen is typically much higher than the number of projects. The top half of the screen shows the number of projects for each level one JTL entry. Note that a task does not appear if no projects were listed against that task (i.e.: T1 through T4). The bottom half of the screen is subdivided into strategic, operational, and tactical options. Clicking on one of the tabs shows the specified level two graph.

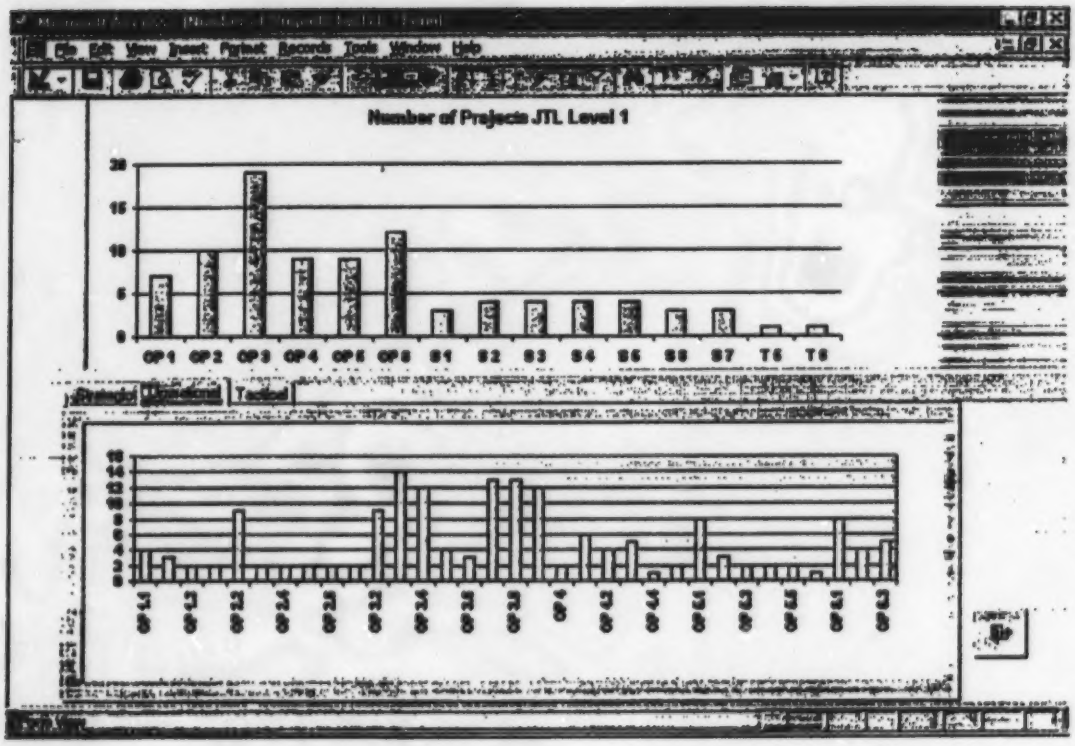

Figure A-7 : Projects By JTL

FUTURE CHANGES

12. A handful of changes is required in the near future to handle data issues. The first involves the changes to the JTL. As the JTL is updated and "Canadianized", the numbering of tasks will change. Since the JTL tasks related to a project are specified by their numerical designation, a means of transferring from the existing JTL to the upgraded JTL will be required.

13. Another change requires a rethinking of the data submitted by the project teams. Presently, the connection between the projects and JTL is a list of associated JTL tasks on the project sheet. This does not distinguish between the JTL tasks directly addressed by the project, and those indirectly influenced by the project. This can cause difficulty by making it appear that projects are capable of addressing more deficiencies than is really the case. Addressing this requires the distinction of associated JTL tasks into at least three categories. Those JTL tasks directly addressed by the project are the most important to highlight. In

addition, the secondary tasks can be broken up into those tasks enhanced by the project, and those tasks simply related to the project, but whose capability level is unaffected. At present, making this distinction is a judgement call from the project teams. However, in the future, capability based planning will necessitate a structure to support these decisions.

ANNEX B - JOINT TASK LIST

1. The Joint Task List given in this Annex is the version used to obtain the inputs for the first version of the database. It is based on the UK Joint Task List version 3.8. This list has since been updated and is in the process of being Canadianized.

STRATEGIC

S 1 Strategic Mobility
- S 1.1 Determine Deployment and Recovery Requirements
  - S 1.1.1 Examine Strategic Movement Options
  - S 1.1.2 Produce DOAST (Desired Order of Arrival)
  - S 1.1.3 Determine Line(s) of Communication (LoC)
  - S 1.1.4 Construct Movement Plan and Obtain Strategic Lift Assets
  - S 1.1.5 Provide Route Clearance & Support
  - S 1.1.6 Reception, Staging, Onward Movement and Integration (RSOI)
- S 1.2 Conduct Deployment & Recovery
  - S 1.2.1 Establish the LoC
  - S 1.2.2 Manage Strategic Movement Resources
  - S 1.2.3 Mount Forces
  - S 1.2.4 Move Forces to Theatre
  - S 1.2.5 Review, Assess and Rectify Reported Capability Shortfalls

S 2 Information & Intelligence
- S 2.1 Plan & Direct Intelligence Activities
  - S 2.1.1 Develop Strategic Intelligence Policy
  - S 2.1.2 Determine Strategic Defence Intelligence Requirements and Priorities
  - S 2.1.3 Prepare Strategic Collection Plan
  - S 2.1.4 Allocate Intelligence Resources Worldwide
  - S 2.1.5 Resolve National Defence Intelligence Issues
- S 2.2 Collect Information on the Strategic Situation
  - S 2.2.1 Monitor the Worldwide Situation and Collect Information, for Intelligence Purposes, on designated areas of National Interest.
  - S 2.2.2 Conduct Special Forces Surveillance and

Reconnaissance (SR) Operations

S 2.3 Process & Exploit Information

S 2.3.1 Provision of Scientific and Technical Intelligence

S 2.3.2 Collate National Information

S 2.3.3 Correlate National Information

S 2.4 Produce Strategic Intelligence

S 2.4.1 Analyse All Situational Information

S 2.4.2 Produce Intelligence Products.

S 2.5 Disseminate & Integrate National Intelligence

S 2.5.1 Provide Defence Intelligence Products to National Planners

S 2.5.2 Respond to National RFIs

S 2.6 Evaluate Intelligence Effectiveness

S 2.6.1 Determine Effectiveness of Defence Intelligence Process

S 3 Employ Forces

S 3.1 Forward Presence of Forces

S 3.1.1 Negotiate and Acquire Host Nation Support

S 3.1.2 Establish Access & Storage Agreements

S 3.1.3 Demonstrate Military Intent

S 3.1.4 Conduct Special Forces Support and Influence Operations

S 3.1.5 Plan and Execute Sanctions/ Embargos

S 3.2 Attack Targets

S 3.2.1 Produce the Joint Integrated Target List (JITL)

S 3.2.2 Prepare and Co-ordinate Targets for Conventional Attack

S 3.2.3 Provide Counter-Air Action

S 3.2.4 Provide Anti-Surface Force Action

S 3.2.5 Provide Strategic Air Offensive Action

S 3.2.6 Conduct Special Forces Offensive Action (OA) Operations

S 3.2.7 Determine Force Effectiveness

S 3.3 Protect Forces and Assets

S 3.3.1 Provide Ballistic Missile Early Warning

S 3.3.2 Provide Security and Counter Intelligence

S 3.3.3 Provide Force Protection

S 4 Sustainment

S 4.1 Meet Personnel Requirements

S 4.1.1 Determine Manpower Requirements

S 4.1.2 Provide Personnel Replacements

S 4.2 Sustain the Force with Materiel and Services

S 4.2.1 Manage the Joint Supply Chain

S 4.2.2 Provide Legal Support

S 4.2.3 Establish Enemy Prisoner of War Policy

S 4.3 Provide Personnel Support

S 4.3.1 Provide Personnel Management and Support Services

S 4.3.2 Provide Health Services

S 4.3.3 Provide for Long Term Health Surveillance

S 4.3.4 Evacuate Casualties

S 4.3.5 Activate Joint Casualty Reporting and Reception Plan (JCRRP)

S 4.4 Develop Sustainment Base

S 4.4.1 Set Sustainment Priorities

S 4.4.2 Provide Strategic Lift for Sustainment

S 4.4.3 Expand Logistic Support

S 4.4.4 Match Medical Support to the Sustainment Requirement

S 4.4.5 Match Transportation to the Sustainment Requirement

S 4.4.6 Match Support to Personnel to the Sustainment Requirement

S 4.4.7 Prepare the Industrial Base (i.e. Mobilization)

S 5 Command

S 5.1 Operate Global CIS

S 5.1.1 Direct and Co-ordinate Strategic Communications

S 5.1.2 Provide and Manage Strategic Defence Information Services.

S 5.2 Assess Global Situation and conduct Joint Military Assessments

S 5.2.1 Monitor the Strategic Situation and the Associated Defence Activities and Operations.

S 5.2.2 Conduct Pol / Military Strategy Review

S 5.2.3 Produce and Issue the Initial CDS Directive

S 5.3 Determine Military Strategic Direction

S 5.3.1 Establish the Capability and Goals of Multinational Elements of the Force

S 5.3.2 Review Contingency Plans and Determine Changes Required

S 5.3.3 Conduct and Issue the Joint Commander's Estimate

S 5.3.4 Identify and Implement Changes to the Joint Force's Notice To Move (NTM)

S 5.4 Provide Strategic Direction to Forces

S 5.4.1 Issue Executive Summary of Estimate, Priorities,

Joint Plans and Directives

S 5.4.2 Command Operations

S 5.4.3 Provide Political Support

S 5.5 Information Warfare

S 5.5.1 Conduct Information Operations

S 5.5.2 Conduct C2W against Strategic Targets

S 5.5.3 Conduct Electronic Warfare against Strategic Targets

S 5.5.4 Conduct Psy Ops against Strategic Targets

S 5.6 Influence Global Perceptions

S 5.6.1 Conduct Media Operations

S 6 FORCE GENERATION

S 6.1 Prepare for Force Generation

S 6.1.1 Conduct Joint Planning of Force Generation

S 6.1.2 Make provision for a Joint Force Headquarters

S 6.1.3 Plan and Implement Force Generation

S 6.1.4 Monitor Readiness of Individuals

S 6.2 Activate Reserve Forces

S 6.2.1 Develop Plans and Procedures for Mobilising Reserves

S 6.2.2 Prepare for Reception of Reserve Personnel.

S 6.2.3 Activate Reserve Personnel

S 6.3 Assemble and Train Forces.

S 6.3.1 Assemble Reserve Elements

S 6.3.2 Audit Unit Readiness

S 6.3.3 Identify Mission Specific Training Requirements

S 7 Force Requirements & Readiness

S 7.1 Formulate Joint Concepts, Doctrine & Requirements

S 7.1.1 Issue Strategic Priorities Policy Guidance

S 7.1.2 Formulate New Joint Doctrine

S 7.1.3 Identify Constraints in Operational Capabilities

S 7.1.4 Generate Operational Requirements to rectify Constraints

S 7.1.5 Develop IT Interoperability Policy

S 7.1.6 Identify and Implement Changes to Force Readiness States

S 7.2 Train Joint Forces

S 7.2.1 Provide the Policy and Methodology for Joint Force Training

S 7.2.2 Develop and Conduct both National and Multinational Tier 3 Training Programmes and Resources

S 7.2.3 Assess Tier 3 Joint Training Effectiveness

OPERATIONAL

OP 1 OP Mobility

OP 1.1 Conduct Movement

OP 1.1.1 Conduct Intra-theatre Deployment /Redeployment

OP 1.1.2 Conduct Reception, Staging, Onward Movement and Integration (RSOI)

OP 1.1.3 Conduct Air-to-Air Refueling Operations

OP 1.1.4 Concentrate Land Forces in Area of Operations

OP 1.1.5 Concentrate Maritime Forces in Theatre

OP 1.1.6 Plan Recovery or Redeployment

OP 1.1.7 Conduct Recovery or Redployment

OP 1.2 Provide Mobility

OP 1.2.1 Overcome Sea Mines

OP 1.2.2 Breach Land Obstacles

OP 1.2.3 Conduct Engineer Support Operations to Sustain the Force

OP 1.2.4 Coordinate Prevention of Mutual Interference & Water Space Management

OP 1.2.5 Air Space Management

OP 1.3 Provide Operational Counter Mobility

OP 1.3.1 Deploy Sea Mines

OP 1.3.2 Create Obstacles.

OP 1.3.3 Plan and Execute Blockades

OP 2 Information & Intelligence

OP 2.1 Plan & Direct Intelligence Activities

OP 2.1.1 Conduct Intelligence Estimate

OP 2.1.2 Determine Information Requirements

OP 2.1.3 Prepare Collection Plan

OP 2.1.4 Allocate In Theatre Intelligence Resources

OP 2.1.5 Review Intelligence Requirements

OP 2.2 Collect Information

OP 2.2.1 Collect Situational Information on Neutral and Friendly Forces

OP 2.2.2 Collect Information on Enemy Forces.

OP 2.2.3 Collect Environmental Information.

OP 2.2.4 Co-ordinate Theatre Surveillance & Recce

OP 2.2.5 Conduct Special Forces Surveillance and Reconnaissance (SR) Operations

OP 2.3 Process & Exploit Information

OP 2.3.1 Conduct Technical Processing

OP 2.3.2 Collate and Correlate Information

OP 2.4 Prepare Intelligence Products

OP 2.4.1 Evaluate, Analyse & Interpret Information

OP 2.5 Disseminate & Integrate Intelligence

OP 2.5.1 Disseminate Intelligence Required

OP 2.6 Evaluate Intelligence Activities

OP 2.6.1 Evaluate Intelligence Activities

OP 3 Conduct Operations

OP 3.1 Conduct Joint Force Targeting

OP 3.1.1 Select Operational Targets for Attack

OP 3.1.2 Produce the Joint Integrated Prioritised Target List (JIPTL)

OP 3.1.3 Allocate Firepower Resources

OP 3.1.4 Develop Fire Support Coordination Measures

OP 3.1.5 Assess Effectiveness of Attacks

OP 3.2 Attack Targets

OP 3.2.1 Attack Ground Targets

OP 3.2.2 Attack Maritime Targets

OP 3.2.3 Conduct Special Forces Offensive Action (OA) Operations

OP 3.3 Conduct Manoeuvre Operations

OP 3.3.1 Conduct Amphibious Operations

OP 3.3.2 Conduct Airborne Operations.

OP 3.3.3 Conduct Offensive Land Operations

OP 3.3.4 Conduct Offensive Maritime Operations

OP 3.3.5 Conduct Information Operations

OP 3.3.6 Conduct Defensive Land Operations

OP 3.3.7 Conduct Defensive Maritime Operations

OP 3.3.8 Provide Combat Search and Rescue

OP 3.4 Control Significant Area

OP 3.4.1 Dominate Key Terrain

OP 3.4.2 Sea Control

OP 3.4.3 Conduct Offensive Counter Air

OP 3.4.4 Conduct Active Defensive Counter Air Operations

OP 3.5 Employ C2W

- OP 3.5.1 Plan the C2W Campaign
- OP 3.5.2 Conduct Offensive C2W Operations
- OP 3.5.3 Conduct Defensive C2W Operations
- OP 3.5.4 Develop Deception Plan
- OP 3.5.5 Conduct Deception
- OP 3.5.6 Employ OPSEC
- OP 3.5.7 Control the Electro Magnetic Spectrum
- OP 3.5.8 Protect use of the Acoustic Spectrum

OP 3.6 Provide Defence against Air, Missile and Torpedoes

- OP 3.6.1 Process & Allocate Air Targets
- OP 3.6.2 Provide Airspace Control
- OP 3.6.3 Conduct Anti Missile Defence
- OP 3.6.4 Conduct Anti Torpedo Defence

OP 3.7 Peacetime Security

- OP 3.7.1 Provide Military Aid to the Civil Community (MACA)
- OP 3.7.2 Conduct Counter Drug Operations
- OP 3.7.3 Provide Geographic Support
- OP 3.7.4 Meteorological, Hydrographical and Oceanographical Support
- OP 3.7.5 Conduct Non Combatant Evacuation Operations (NEO)
- OP 3.7.6 Conduct Operations to provide Services assistance for Disaster Relief and Humanitarian Aid outside the UK.

OP 3.8 Conduct Peacekeeping Operations

- OP 3.8.1 Observe and Monitor
- OP 3.8.2 Supervise Truces and Ceasefires
- OP 3.8.3 Interposition
- OP 3.8.4 Provide Transition Assistance
- OP 3.8.5 Demobilisation and Disarmament
- OP 3.8.6 Provide Humanitarian Relief and its Protection
- OP 3.8.7 Provide Explosive Ordnance (Mine) Clearance.

OP 3.9 Conduct Peace Enforcement Operations

- OP 3.9.1 Restore Law and Order
- OP 3.9.2 Protect Humanitarian Operations and Human Rights
- OP 3.9.3 Contain Conflict
- OP 3.9.4 Forcibly Separate Belligerent Parties
- OP 3.9.5 Establish and Supervise Protected or Safe Areas

OP 3.9.6 Guarantee and Denial of Movement

OP 3.9.7 Enforcement of Sanctions

OP 4 Sustain the Force

OP 4.1 Manage Logistic Support in Theatre of Operations

OP 4.1.1 Supply the Force

OP 4.1.2 Provide Transportation and Movements

OP 4.1.3 Provide Services

OP 4.2 Manage Equipment Support in the Theatre of Operations

OP 4.2.1 Maintain Equipment

OP 4.2.2 Manage Equipment

OP 4.3 Coordinate Effective Manning of Joint Forces and Provide all Personnel related Support Services including Health Support

OP 4.3.1 Provide Personnel Support Services

OP 4.3.2 Provide Personnel Services

OP 4.3.3 Provide Legal Services to JFHQ

OP 4.3.4 Provide Medical Services

OP 4.3.5 Conduct Mission Specific Training

OP 4.4 Rehabilitate Forces

OP 4.4.1 Rehabilitate Units

OP 4.5 Develop Forward Bases

OP 4.5.1 Select and Establish FMBs.

OP 4.5.2 Select and Establish PODs

OP 4.5.3 Establish and Develop the Force Rear Support Area (FRSA)

OP 4.5.4 Provide for EPW

OP 5 Command & Control

OP 5.1 Acquire & Communicate Information & Maintain Status

OP 5.1.1 Provide Information Exchange Capability

OP 5.1.2 Direct the Use of CIS Services

OP 5.1.3 Maintain and Manage the Information Requirement

OP 5.1.4 Collect Data to Identify Remedial Action

OP 5.2 Prepare Plans & Orders

OP 5.2.1 Conduct the Operational Level Estimate

OP 5.2.2 Produce the Campaign Plan

OP 5.2.3 Identify and Report Shortfalls in Capability.

OP 5.3 Command Subordinate Forces

OP 5.3.1 Request Changes to Rules of Engagement.

OP 5.4 Organise Joint Force Headquarters

OP 5.4.1 Establish the Joint Task Force Headquarters Command Structure

OP 5.4.2 Establish Liaison Structure

OP 5.4.3 Establish National Command and Support Elements (NCE/NSE)

OP 5.5 Provide Civil Affairs and Integrate Multinational, Other Government Depatments & Agency Support

OP 5.5.1 Implement Host Nation Support

OP 5.5.2 Coordinate Civil Administration

OP 5.5.3 Conduct Media Operations

OP 5.5.4 Foster Civil/ Military Co-operation

OP 5.5.5 Conduct Special Forces Support and Influence Operations

OP 6 Force Protection

OP 6.1 Provide Protection

OP 6.1.1 Provide Physical Protection

OP 6.1.2 Conduct Counter Surveillance

OP 6.1.3 Counter the Effects of Enemy Conventional Attacks by Passive Defence

OP 6.1.4 Recuperate from the Effects of Enemy Conventional Attack

OP 6.1.5 Protect Against Battlespace Hazards

OP 6.1.6 Establish Disaster Control Measures

OP 6.1.7 Provide CSS Protection

OP 6.1.8 Provide Fire Protection

OP 6.1.9 Counter Fratricide

OP 6.2 Provide Force Security

OP 6.2.1 Provide Personnel Security

OP 6.2.2 Provide Information Security

OP 6.2.3 Defend Key Points

OP 6.2.4 Defend LOCs on Land

OP 6.2.5 Integrate Host Nation Security

OP 6.3 Provide NBC Protection

OP 6.3.1 Provide Detection, Identification and Monitoring

OP 6.3.2 Provide NBC Warning & Reporting

OP 6.3.3 Provide NBC Individual & Collective Protection

OP 6.3.4 Undertake NBC Hazard Management

OP 6.3.5 Provide Medical Counter Measures and Support

TACTICAL

- T 1 Achieve Tactical Mobility
  - T 1.1 Position Tactical Forces
    - T 1.1.1 Plan, Record and Control Unit Movement
    - T 1.1.2 Avoid Fratricide & Mutual Interference Between Cbt, Sp Elms & Others
    - T 1.1.3 Prepare Forces for Tactical Movement
    - T 1.1.4 Move and Close into Tactical Position
    - T 1.1.5 Report and Monitor Land, Air and Water Space Management
  - T 1.2 Provide Tactical Mobility
    - T 1.2.1 Overcome Barriers, Obstacles and Mines
    - T 1.2.2 Conduct Engineer Support Operations to Enhance Movement
  - T 1.3 Provide Tactical Counter Mobility
    - T 1.3.1 Select Location of Obstacles
    - T 1.3.2 Emplace Obstacles
    - T 1.3.3 Execute Quarantines/Sanctions/Embargoes
    - T 1.3.4 Implement Blockades
- T 2 Gather and Use Information and Intelligence
  - T 2.1 Develop & Analyse Tactical Int Activities and Requirements
    - T 2.1.1 Establish Commander's Critical Intelligence Requirements (CCIRs)
    - T 2.1.2 Conduct Intelligence Estimate, Including the IPB
    - T 2.1.3 State Information Requirements
    - T 2.1.4 Produce Collection Plan
    - T 2.1.5 Review Intelligence Requirements
    - T 2.1.6 Analyse Intelligence Activities
  - T 2.2 Collect Information
    - T 2.2.1 Collect Situational Information on Neutral and Friends
    - T 2.2.2 Collect Information on Enemy Forces and Targets
    - T 2.2.3 Collect Environmental Information
    - T 2.2.4 Perform & Control Surveillance and Recce Forces
    - T 2.2.5 Collect Joint Combat Identification
    - T 2.2.6 Conduct Special Forces Surveillance and Recce (SR) Ops
  - T 2.3 Process Information & Intelligence
    - T 2.3.1 Conduct Tactical Level Processing
    - T 2.3.2 Collate and Correlate Information

- T 2.3.3 Evaluate, Integrate, Analyse and Interpret Threat Information
- T 2.3.4 Evaluate Social, Political, Economic & Environmental Info
- T 2.3.5 Integrate Intelligence Information
- T 2.3.6 Identify Tactical Issues & Threats
- T 2.3.7 Determine Enemy's Op Capabilities, Courses of Action & Intentions
- T 2.3.8 Identify Friendly/Adversary/Neutral Centres of Gravity

T 2.4 Convey Intelligence & Reports

- T 2.4.1 Prepare and Disseminate Intelligence Reports

T 3 Employ Firepower

T 3.1 Conduct Tactical Targeting

- T 3.1.1 Identify Targets to Attack
- T 3.1.2 Select Fire Attack Systems
- T 3.1.3 Assess Effectiveness of Attacks
- T 3.1.4 Identify the Reasons for Shortfall in Effectiveness
- T 3.1.5 Request Attack

T 3.2 Attack Targets

- T 3.2.1 Conduct Lethal Engagement of Targets
- T 3.2.2 Conduct Fire/Close Air Support
- T 3.2.3 Conduct Strike, Surface, Subsurface, Air Defence/Anti-Air Attack
- T 3.2.4 Conduct Air Interdiction of Operational Forces/Targets
- T 3.2.5 Conduct Surface/Subsurface Firepower Interdiction of Op Forces/Targets
- T 3.2.6 Adjust & Illuminate Targets
- T 3.2.7 Conduct Special Forces Offensive Action Operations (OA)
- T 3.2.8 Conduct Non-Lethal Engagement

T 4 Perform Logistics and Sustainment

T 4.1 Conduct Logistic Support in AO

- T 4.1.1 Sustain the Force
- T 4.1.2 Conduct Transportation and Movements
- T 4.1.3 Supply Services and Advice
- T 4.1.4 Track & Account for Assets & Equipment
- T 4.1.5 Establish Support for POW

T 4.2 Conduct Equipment in AO

- T 4.2.1 Repair Equipment
- T 4.2.2 Maintain Equipment Support

T 4.2.3 Conduct Recovery, Salvage & Backloading

T 4.3 Perform Civil Military Engineering Support

T 4.3.1 Perform Rear Area Restoration

T 4.3.2 Conduct Engineer Support Operations to Sustain Force

T 4.3.3 Perform Engineer Construction Services

T 4.3.4 Obtain Engineer Construction Materials

T 4.3.5 Supply Mobile Electric Power

T 4.4 Man the Force & Provide Personnel Support Services

T 4.4.1 Conduct Personnel Support Services

T 4.4.2 Conduct Medical Support to Optimise Force Strength

T 4.4.3 Conduct Casualty Evacuation

T 4.4.4 Advise Comds on Health of Force to Include Battle Casualty Rates

T 4.5 Establish Forward Bases

T 4.5.1 Establish Forward Maintenance & Mounting Bases (FMBs)

T 4.5.2 Establish the Force Rear Support Area (FRSA)

T 4.5.3 Establish PODs

T 4.5.4 Establish & Maintain Campaign/Sustainment Bases

T 5 Exercise Command and Control and Conduct Operations

T 5.1 Operate & Manage Tactical C4

T 5.1.1 Conduct C4 Services & Manage Communications Means

T 5.1.2 Manage the Requirement for Information

T 5.1.3 Report data to Identify Remedial Action

T 5.2 Prepare Plans & Issue Plans and Orders

T 5.2.1 Analyse Mission & Current Situation

T 5.2.2 Produce Tactical Level Estimates

T 5.2.3 Decide on the Need for Action or Change

T 5.2.4 Identify and Report Shortfalls in Capability & Requirements

T 5.2.5 Maintain Field Records & Report Actions

T 5.3 Conduct Tactical Manoeuvre

T 5.3.1 Conduct a Show of Force

T 5.3.2 Plan & Execute Demonstration

T 5.3.3 Conduct Forcible Entry: Airborne, Amphibious & Air Assault

T 5.3.4 Reinforce & Expand Lodgement

T 5.3.5 Conduct Raids in the OA

T 5.3.6 Conduct Penetration, Direct Assault & Turning Movements

T 5.3.7 Conduct Direct Action in the OA

T 5.3.8 Conduct Unconventional Warfare in the OA

T 5.4 Control Significant Areas

T 5.4.1 Control or Dominate by Patrols, Firepower or Potential

T 5.4.2 Occupy Combat Areas

T 5.4.3 Conduct Special Forces Support and Influence Operations (SI)

T 5.4.4 Conduct Defensive Counter Air Operations and Control Airspace

T 5.4.5 Dominate Key Terrain

T 5.4.6 Establish Sea Control

T 5.4.7 Conduct Anti-Missile & Torpedo Defence

T 5.5 Conduct Operations in Combat Area

T 5.5.1 Conduct Amphibious Operations

T 5.5.2 Conduct Airborne Operations

T 5.5.3 Conduct Offensive Land Operations

T 5.5.4 Conduct Offensive Maritime Operations

T 5.5.5 Conduct Defensive Land Operations

T 5.5.6 Conduct Defensive Maritime Operations

T 5.6 Conduct C2W

T 5.6.1 Execute Deception Plans

T 5.6.2 Conduct OPSEC

T 5.6.3 Conduct Psy Ops

T 5.6.4 Conduct EW

T 5.6.5 Conduct Rapid Environmental Assessment (REA)

T 5.7 Lead Subordinate Forces

T 5.7.1 Implement Rules of Engagement

T 5.7.2 Issue Orders & Implement Command and Control Arrangements

T 5.7.3 Establish & Employ Liaison Officers

T 5.7.4 Maintain Unit Discipline & Motivation

T 5.7.5 Conduct Mission Specific Training & Rehearsals

T 5.7.6 Manage POWs

T 5.8 Provide Civil Affairs and Integrate Multinational, Other Government Departments and Agency Support

T 5.8.1 Utilise Host Nation Support

T 5.8.2 Foster Civil/Military Co-operation

T 5.8.3 Support Internal Orgs in the Control & Coord of Indigenous Police Forces

T 5.8.4 Utilise Public Information Service

- T 5.8.5 Deliver Geographic, Meteorological and Oceanographical Support & Data
- T 5.9 Conduct Military Operations Other Than War
  - T 5.9.1 Conduct MACA
  - T 5.9.2 Conduct Peacekeeping Activities
  - T 5.9.3 Conduct Peace Enforcement Activities
  - T 5.9.4 Conduct the Evacuation of Non Combatants
  - T 5.9.5 Conduct Civil/Military Activities & Community Relations Programs

T 6 Protect The Force

- T 6.1 Conduct Protection
  - T 6.1.1 Conduct Direct Physical Protection
  - T 6.1.2 Defend Against Enemy Conventional Attacks
  - T 6.1.3 Protect Against Battlespace Hazards
  - T 6.1.4 Defend Key Points
  - T 6.1.5 Defend LoCs & Log Bases
  - T 6.1.6 Implement Disaster Control & WMD Measures
  - T 6.1.7 Protect Vulnerable Areas
  - T 6.1.8 Establish Fire Protection
  - T 6.1.9 Implement Counter Fratricide Measures
  - T 6.1.10 Conduct ECM, EPM & EWSM
- T 6.2 Provide Force Security
  - T 6.2.1 Conduct Personnel Security
  - T 6.2.2 Conduct Security Measures
  - T 6.2.3 Integrate Host Nation Security
  - T 6.2.4 Employ Concealment Techniques
  - T 6.2.5 Employ Counter Surveillance, Security & Readiness Measures
  - T 6.2.6 Conduct INFOSEC
  - T 6.2.7 Conduct Combat Search and Rescue
- T 6.3 Conduct NBC Protection
  - T 6.3.1 Conduct Detection, Identification and Monitoring
  - T 6.3.2 Conduct NBC Warning & Reporting
  - T 6.3.3 Execute NBC Individual & Collective Protection
  - T 6.3.4 Conduct NBC Hazard Management
  - T 6.3.5 Conduct Medical Counter Measures

ANNEX C - SAMPLE PROJECT SUMMARY SHEET

PROJECT NO	PROJECT NAME	CATEGORY	PROJECT PHASE	LAST UPDATE
A0081	CF-18 INCREMENTAL MODERNIZATION	Mixed funding	Development/Definition	07 Sept 99

PROJECT DETAILS

General Description	This project will correct critical capability deficiencies in a timely manner so that essential operational capability and interoperability with our allies is regained and maintained. As well it will ensure that critical supportability concerns are addressed.
Capability Deficiency	1. As stated in DPG 98, the CF-18 constitutes the primary combat capability of the air force and is Canada's only means of exercising active control over unwanted activities in domestic and international airspace 2. The CF-18 is experiencing significant operational capability deficiencies. The fleet is encountering parts obsolescence and supportability problems, interoperability shortcomings, and its operational capability has markedly degraded. 3. a. <u>Parts obsolescence and supportability.</u> CF-18 avionics systems are becoming more expensive and difficult to support as parts become obsolete. Nearly 80% of the CF-18 cockpit display components will be out of production by 1999. The Mean Time Between Failure (MTBF) of the APG 65 radar has decreased from 90 hours to 30 hours and some components will not be supported by industry beyond 1999. b. <u>Operational Capability and Survivability</u>. The CF-18 radar is readily jammed and is deficient in detection, tracking, and sorting of aircraft. The current APG 65 processing speed is inadequate and it has no capability to engage multiple targets. The mission computers lack speed, memory, and processing power, necessitating the use of unique Canadian Operational Flight Program (OFP) software in lieu of a far more capable United States Navy (USN) software OFP. The aircraft does not have the Stores Management System and necessary weapons interfaces required by many current generation weapons such as advanced air-air weapons and many types of Precision Guided Munitions. The existing Defensive Electronic Warfare

	Suite (DEWS) is ineffective against many contemporary threats. There is no helmet-mounted sight, a deficiency that greatly restricts the effectiveness of the off-boresight weapons designation and launch capability. c. Interoperability. Many of our allies have updated, or are in the process of updating, their fighter aircraft with systems that are no longer interoperable with the CF-18. The CF-18 lacks a data link, jam-resistant communications and an airborne IFF interrogation system. Due to radar shortcomings the CF-18 cannot meet NORAD requirements on low-observable target engagements. As well, its ability to fulfill the NORAD role as an all weather day-night fighter is severely limited. The CF-18 also fails to meet the NATO requirements on multiple air-to-air engagement capability. 4. The CF-18 began entering service in 1982 with an original estimated life expectancy (ELE) of 2003. As a result of an aggressive fatigue life management program the airframe life has been extended to 2010. Canada is participating in an international structural test program aimed at determining the economic life of the airframe with an objective of extending the airframe life to the 2020 time frame. Significant effort and expense is currently being incurred through the National Procurement program to maintain the fleet in a safe and airworthy condition.
Planned Deliverables	Up to one hundred aircraft will be modernized.

PROJECT MILESTONES AND CASHLINE

START IMPLEMENTATION	INITIAL OP CAPABILITY			FULL OP CAPABILITY			PROJECT COMPLETION			LIFE EXPECTENCY		
PROJECT CASHLINE	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	Subs	Total
	$3M	$13.9M	$26,4M	$132M	$108M	$213M	$257M	$223M	$78M			$1.056B
EXPECTED O&M IMPACT	Neutral											

PROJECT ASSESSMENT FACTORS

APPLICABLE UKJTL CAPABILITIES	APPLICABLE DEF SCENARIOS	APPLICABLE DPG 2000 DEFENCE/CHANGE OBJECTIVES	APPLICABLE MISSIONS
S3.1.3, S3.2.2, S3.2.3, S3.2.4, S3.2.5, S3.4.3., S3.4.4, S3.3.3, OP3.2.1, OP3.3.3, OP3.4.1, OP3.6.2, OP3.7.2, OP3.9.2, OP3.9.3, OP3.9.6, OP3.9.7, OP6.2.3, OP6.2.4,	4, 5, 6, 8, 9, 10, 11	D02, D04, C03, C04, C05,	

STRATEGIC VALIDITY	The CF-18 constitutes the primary combat capability of the air force and is Canada's only means of exercising active control over unwanted activities in domestic and international airspace. Without a capable and interoperable fighter aircraft the CF is unable to provide a credible capability to establish sovereignty over Canadian airspace nor is the CF able to participate in multinational coalition operations in support of Government policy. A modern fighter is a keystone capability in fielding a modern air component within a capable CF.	
OPERATIONAL AND FORCE STRUCTURE IMPERATIVES	"The focus of the future activities of the air force will be "...,the modernization of the Aurora and CF-18 fleets in order to improve the air force's capability to conduct air combat operations." (DPG 2000).	
CAPABILITY IMPERATIVE	The role of Canada's air forces is to generate and maintain combat capable, multi-purpose air forces to meet Canada's defence policy objectives. Crucial to the successful fulfilment of this role are the fleets of aircraft assigned to Canada's air forces (DPG 2000).	
STRATEGIC RISK ASSESSMENT MISSION AND FORCE	Mission	Without a capable interoperable fighter, there is a high risk that Canada will not be an effective part of international operations. We will either not be asked to participate, with the associated loss of international presence and prestige, or we will be assigned a peripheral/unimportant task with an equal loss of status.
	Force	Without a capable fighter, any Canadian force deployed or in operations will be at high risk of suffering unacceptable losses from enemy action.

PROJECT ACHIEVABILITY AND RISK ASSESSMENT	The risk associated with certain individual items within the omnibus is high; however, it is expected to drop to low by the time these projects are ready for implementation. Most of the equipment is available off-the-shelf with minimal development. The majority of the risk is associated with integration and software modernization. The project office will institute a formal risk management process with all involved contractors. A risk assessment will be made for each project as it is put forward for the required expenditure authority.
GOVERNMENT DIRECTION	
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This report presents an analysis of the project information presented by the Long Term Capital Plan submissions that may assist in defining a reasonable set of Canadian Forces capabilities necessary to address Canadian security requirements. Although problems do exist with the data collected, a statistical analysis of operational tasks from the Joint Task List provides a number of groupings of related tasks. These groupings can be used as support for an eventual definition of Canadian Forces capabilities.

This report also gives the author's vision of a capability based planning process. In this process, risk is determined at a departmental level, then translated into a number of capability options. These capability options are addressed through projects. Combining the capability options with the project costs yields a blueprint to address the maintenance of overall CF capability for the lowest cost.

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Long Term Capital Plan
LTCP
Strategic Capability Planning
SCP
Joint Task List
JTL
Microsoft Access
Capability Based Planning
Cluster Analysis
SOCRAM